
P A R T 1 – Design Standards

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1. General Considerations

- A. References and Authority.** The Transportation Department Director is authorized by the Transportation Development Code, BCC 14.60, to prepare, adopt, and update design standards to establish minimum requirements for the design and construction of transportation facilities and requirements for protecting existing facilities during construction. The standards contained in this Design Manual constitute the design standards authorized by BCC 14.60.021. These standards are intended to be consistent with the most currently adopted provisions and editions of the Bellevue city code, the Comprehensive Plan, and the publications cited in the appendices of this Manual.
- B. Permits.** Permits, approvals, and agreements are required by the city, and sometimes other jurisdictions, prior to the initiation of any construction described within this Manual. The majority of work covered under these standards will require multiple permit authority review and approvals. Any questions about permits, approvals, and agreements should be directed to the appropriate code authority at the city's Permit Center.
- C. Professional Qualifications.** Professionals in the technical fields of civil engineering, structural engineering, electrical engineering, geotechnical engineering, landscape architecture, soils engineering, and surveying who prepare or are responsible for the preparation of drawings, plans, specifications, or technical reports for obtaining permits and approvals shall be currently licensed or registered in the state of Washington. These professionals shall be qualified by both experience and educational background in the technical areas as warranted by the specifics of the proposed project.
- D. Deviation from Standards.** Except as provided for elsewhere in other city codes or resolutions, deviations from these standards may be granted by the Transportation Department Director or the Director's designated representative. The Director's decision to grant, deny, or modify the proposed deviation shall be based upon evidence that the request can meet the following criteria:
- (1) Except where infill development is proposed, the deviation will achieve the intended result with a comparable or superior design;
 - (2) The deviation will not adversely affect safety or operation; and
 - (3) The deviation will not adversely affect maintainability.

A request for approval of a deviation to a Design Manual standard must be submitted by the applicant in writing to the Development Review Manager, presenting supporting information that would justify approval of the request in terms of the above criteria. For deviations to engineering design standards addressed by the AASHTO *Policy on Geometric Design of Highways and Streets*, WSDOT's *Design Manual* and other supporting manuals, or the *Public Rights-of-Way Accessibility Guidelines*, the applicant shall complete the city's Deviation/Exception Justification Form. The applicant's engineer shall complete and stamp appropriate justification, which shall include the relevant standard, a summary of alternatives considered, and justification for the proposed design decision. The Review Engineer will submit complete documentation to the Transportation Department's Office Engineer for review and action.

Where infill development is proposed, the Review Engineer shall have the authority to allow a deviation from these standards in order to allow the new conditions to be consistent with adjacent conditions if, in the discretion of the Review Engineer, the adjacent conditions are unlikely to be replaced or modified in the foreseeable future, and if the deviation satisfies criteria (2) and (3) mentioned above.

E. Changes to This Manual. From time to time, it may be necessary to modify the standards in the Design Manual. The Director of the Transportation Department may incorporate minor changes to this Manual as they become necessary; general updates shall include an opportunity for public review and comment.

F. Other Design Criteria. In addition to the standards and design criteria in the Design Manual and in the Bellevue city code, decisions regarding sight distance, horizontal and vertical alignment, signage, and other criteria appropriate for the design of city streets shall be consistent with the AASHTO, WSDOT, and APWA design manuals, the ADA, and the MUTCD.

Design of transportation facilities and pedestrian-related infrastructure shall be consistent with the requirements of the ADA, the PROWAG, and the applicable guidelines of WSDOT's design manual.

G. Meaning of Terms. The definitions of words and phrases as contained in BCC 14.60 are hereby incorporated by reference.

H. Abbreviations.

- AASHTO - American Association of State Highway and Transportation Officials
- ADA - Americans with Disabilities Act
- PROWAG – Public Right of Way Accessibility Guidelines
- APWA - American Public Works Association
- MUTCD - Manual on Uniform Traffic Control Devices
- WSDOT - Washington State Department of Transportation

2. Public Streets External to Subdivisions

A. Pursuant to BCC 14.60.110, the developer of land as described in that section is required to install street frontage improvements. The cross section and the extent of the street frontage improvements shall be determined by the Review Engineer based upon the most currently adopted provisions and editions of the Bellevue city code, this Design Manual, adopted city plans, and the Comprehensive Plan. Pavement specifications shall be as shown in Design Manual Drawings DEV-8, DEV-9, and applicable ROW drawings. Intersection setback and sight distance requirements are as specified in Design Manual Drawings TE-1, TE-2, and TE-3; and Design Manual Standards 21 and 22. Roadway sight distance, horizontal and vertical alignment, and other design criteria are as specified in the AASHTO, WSDOT, and APWA design manuals.

B. Provision of a four-foot planter strip with landscaping or drainage swale between the curb and the sidewalk is preferred. Where site conditions preclude provision of a full four-foot planter strip, a narrower planter strip is preferable to none at all. The requirement to provide a planter strip and landscaping between the curb and the sidewalk (outside Downtown) will be determined by the Review Engineer, based upon site conditions. Landscaping design must conform to Water Utility Code (BCC 24.02) requirements for water conservation. Landscaping requirements for Downtown are specified by Land Use Code 20.25A.060.

- C. All new public streets will be named by the city’s Parcel and Address Coordinator. Street signing shall be provided by the developer per Design Manual Drawings TE-21, TE-22A, TE-23A, and TE-24. The developer shall coordinate with the Transportation Department Inspector prior to sign installation in order to determine appropriate sign locations.

3. Public Streets Internal to Subdivisions

- A. Access for ten or more single family lots in new subdivisions must be provided by public streets within dedicated right of way.
- B. Pavement and right of way widths for public streets in new subdivisions shall be determined by the provision of on-street parking and the number of single-family lots to be served, as illustrated in Table 1 below.

Table 1. Public Streets Internal to Subdivisions

Parking ⁽¹⁾	Number of Single Family Lots	Number of Lanes	Paved Width Min. (ft)	ROW Width Min. (ft)
None	10 to 15	2 lanes ⁽²⁾	20	35
One side	10+	2 lanes ⁽²⁾	24	45
Both sides	10+	2 lanes	28	50

(1) Requirement for provision of on-street parking shall be at the discretion of the Review Engineer.

Preferred width of new public streets is 24 feet.

(2) Where parking is not allowed, “No Parking Anytime” signs are required.

- C. See BCC 14.60.190 and Design Manual Standard 14 for sidewalk requirements and dimensions.
- D. Provision of a four-foot planter strip with landscaping or drainage swale between the curb and the sidewalk is preferred. Where site conditions preclude provision of a full four-foot planter strip, a narrower planter strip is preferable to none at all.
- E. All new public streets will be named by the city’s Parcel and Address Coordinator. Street signing shall be provided by the developer per Design Manual Drawings TE-21, TE-22A, TE-23A, and TE-24. The developer shall coordinate with the Transportation Department Inspector prior to sign installation for appropriate sign locations.

4. Private Roads

Definition: a way located on private property, open to vehicular ingress and egress, established as a separate tract or easement for the benefit of three to nine adjacent properties or dwelling units.

- A.** Private roads that serve or will serve from three to nine lots must be a minimum of 20 feet wide and placed in an easement or tract having a minimum width of 25 feet. See BCC 14.60.190 for nonmotorized facility requirements. Where nonmotorized facilities are required, the width of the private road easement or tract shall be increased to 30 feet, and a public easement encompassing the nonmotorized facility may be required.
- B.** Private roads in commercial planned unit developments or in single-family or multi-family planned unit developments containing three or more lots or dwelling units must have a minimum pavement width of 24 feet, with a five-foot-wide sidewalk on at least one side and sufficient off-street parking. The 24-foot minimum pavement width in a planned unit development is to accommodate the more intense activity generated by higher density. A public easement encompassing the nonmotorized facility may be required.
- C.** The pavement, easement, and tract widths stated in this section are minimums. Private road width requirements may be increased at the discretion of the Review Engineer if necessary for safe vehicle movement or to accommodate grading, utilities, on-street parking, turning movements or nonmotorized facilities. In a residential development, provision of on-street parking is encouraged by providing some private road segments with a minimum width of 24 feet (to allow parking on one side) or a minimum width of 28 feet (to allow parking on both sides). Turning movements, sight lines, and emergency vehicle clearance must also be considered when designing to accommodate on-street parking on private roads. Where a private road is widened to allow parking, such parking areas may be constructed with a pervious surface to reduce water runoff.
- D.** Where public street improvements exist, the entrance to a private road shall be constructed with a driveway approach rather than a curb return. See Design Manual Drawings DEV-7A, DEV-7C, DEV-7D, DEV-7E, and DEV-7F. A curb return may be constructed with approval of the Review Engineer if the private road entrance meets the criteria for a private intersection as specified in Design Manual Standard 6. At the discretion of the Review Engineer, a private road that is less than 24 feet wide may be required to flare out to a width of at least 24 feet in the driveway approach area in order to accommodate expected turning movements.
- E.** Private roads shall be limited to a grade of 10% or less for 20 feet past the back of the driveway approach and shall be limited to a maximum grade of 15% thereafter. If a driveway approach is not required, the Review Engineer will determine the start of measure for the 10% grade to accommodate sight distance requirements per Design Manual Standards 21 and 22 and future road improvements. See Table 2 (Landing Grades for Private Roads and Driveways).
- F.** Private roads shall be paved full-width for their entire length. See Design Manual Standard 11 for curb and gutter requirements.

- G.** Private roads shall be aligned with driveways, private roads, and public streets located on the opposite side of the street. Deviations from this requirement must be approved by the Review Engineer. Where compliance with this requirement is not possible, private roads shall be offset at least 100 feet from driveways, private roads, and public streets located on the opposite side of the street. The offset distance shall be measured from Point A to Point A as shown in Design Manual Drawings DEV-7A, DEV-7D, DEV-7E, and DEV-7F. Deviations from this requirement must be approved by the Review Engineer.
- H.** Private roads shall be separated a minimum distance of 100 feet from adjacent driveways or private roads measured from Point A to Point A. Point A is defined in Design Manual Drawings DEV-7A, DEV-7D, DEV-7E, and DEV-7F. Deviations from this requirement must be approved by the Review Engineer. Where compliance with this requirement is not possible, the private road shall be separated as far as possible from adjacent driveways or private roads. In no case shall the separation distance be less than 20 feet.
- I.** Private roads shall be separated a minimum distance of 150 feet from the nearest parallel public street. The separation distance shall be measured from Point A of the private road approach to the nearest edge of the travel lane of the public street. Point A is defined in Design Manual Drawings DEV-7A, DEV-7D, DEV-7E, and DEV-7F. Where compliance with this requirement is not possible, the private road shall be separated as far as possible from the nearest parallel public street. In no case shall the separation distance be less than 20 feet.
- J.** The city shall not permit more than one private road opening on any property having a street frontage of 200 feet or less. This paragraph shall not apply if the property's street frontage is less than 200 feet and the property is at least three acres in area.
- K.** Except as stated in paragraphs A through J above, all private roads shall be constructed to public street standards per the specifications shown in Design Manual Drawings DEV-8 and DEV-9 and Design Manual Standard 11 (for curb and gutter requirements). The Review Engineer may allow modifications such as an inverted crown or a thickened asphalt edge rather than curb, provided that storm water treatment will be adequate and safety will not be compromised. A geotechnical analysis of the proposed private road design may be required at the discretion of the Review Engineer.
- L.** New private roads will be named by the city's Parcel and Address Coordinator. Appropriate street name signing shall be provided by the developer per Design Manual Drawings TE-21, TE-22B, TE-23B, and TE-24. The developer shall coordinate with the Transportation Department Inspector prior to sign installation to determine appropriate sign locations.

5. Driveways and Driveway Approaches

Definition: a private way of vehicular ingress and egress to a site, extending into the site from a public street or private road.

- A.** Driveways serve:
- (1) one residential lot (residential driveway);
 - (2) two residential lots (residential joint-use driveway); or
 - (3) as access to commercial development (commercial driveway).
- B.** Driveway approaches provide the transition from the street to the driveway or private road. Where public street improvements exist, the driveway approach shall be a formed concrete structure as specified in Design Manual Drawings DEV-7A, DEV-7C, DEV-7D, DEV-7E, and DEV-7F. Where public street improvements do not exist, the driveway approach shall be asphalt and constructed as specified in Design Manual Drawing DEV-7B. If there is a taper from the driveway to the driveway approach, the taper design shall be as specified by the Review Engineer.
- C.** Residential and residential joint-use driveways must be paved full width for the entire length.
- D.** For commercial driveways located on arterials, no parking stalls shall be located closer than 20 feet from the face of curb (or the edge of the driving lane if there is no curb) in order to preclude conflicts with entering vehicles. No such clear area is required for driveways serving multifamily developments on non-arterial streets.
- E.** All driveways shall be 90 degrees to the street, unless designated as right turn only.
- F.** All driveways shall be aligned with driveways, private roads, and public streets located on the opposite side of the street. Deviations from this requirement must be approved by the Review Engineer. Where compliance with this requirement is not possible, driveways shall be offset at least 100 feet from driveways, private roads, and public streets located on the opposite side of the street. The offset distance shall be measured from Point A to Point A. Point A is defined in the Design Manual Drawings DEV-7A, DEV-7D, DEV-7E, and DEV-7F. Deviations from this requirement must be approved by the Review Engineer.
- G.** All driveways shall be separated a minimum distance of 100 feet from any other parallel driveway or private road. The separation distance shall be measured from Point A to Point A. Point A is defined in the Design Manual Drawings DEV-7A, DEV-7D, DEV-7E, and DEV-7F. Where compliance with this requirement is not possible, driveways shall be separated as far as possible from adjacent driveways and private roads. In no case shall the separation distance be less than 20 feet.
- H.** All driveways shall be separated a minimum distance of 150 feet from the nearest parallel public street. The separation distance shall be measured from Point A of the driveway to the nearest adjacent edge of the travel lane of the public street. Point A is defined in the Design Manual Drawings DEV-7A, DEV-7D, DEV-7E, and DEV-7F. Where compliance with this requirement is not possible, driveways shall be separated as far as possible from the nearest adjacent parallel public street. In no case shall the separation distance be less than 20 feet.

- I. The city shall not permit more than one driveway opening on any property having a street frontage of 200 feet or less. This paragraph shall not apply if the property's street frontage is less than 200 feet and the property is at least three acres in area. The Review Engineer may allow an exception to this requirement if safety or traffic operations will be improved with one or more additional driveways.
- J. Where the building façade or other design element is less than ten feet behind the sidewalk (as is typical Downtown), both pedestrian and vehicular sight distance shall be maintained. Sight distance and setback requirements shall be specified per Design Manual Drawings TE-1, TE-2, TE-3, and Design Manual Standards 21 and 22.
- K. All driveways shall be limited to a grade of 10% or less for 20 feet past the back of the driveway approach, as listed in Table 2 below, and shall be limited to a maximum grade of 15% thereafter. If a driveway approach is not required, the Review Engineer will determine the start of measure for the 10% grade to accommodate sight distance requirements per Design Manual Drawings TE-1, TE-2, TE-3, and Design Manual Standards 21 and 22. Grade changes must be rounded off so that vehicles do not bottom out and abrupt grade changes do not interfere with the sight distance requirements.

Table 2. Landing Grades for Private Roads and Driveways

Access Types	Non-Arterial (max. grade/min. length past driveway approach)	Arterial (max. grade/min. length past driveway approach)
Single-Family Residential, Driveway	10%/20 feet	10%/20 feet
Single-Family Residential, Private Road	10%/20 feet	10%/20 feet
Commercial with parking garage at back of sidewalk	To be determined by the Review	To be determined by the Review Engineer
Commercial with no parking garage at back of sidewalk	10% / 20 feet	7% / 30 feet

- M. Minimum residential driveway widths shall be as shown in Table 3 below. Required driveway widths will be specified by the Review Engineer. A greater width, but not more than 30 feet, may be considered for single-family and duplex residences with multiple car garages.

Table 3. Residential Driveway Widths

Access Road Type	Number Of Single Family Lots	Paved Width Minimum (Feet)	Easement Width Minimum (Feet)
Driveway	1	10	N/A
Joint-Use Driveway	2	16	20

- N.** The width of commercial driveways, including driveways for multifamily development, shall be as required by the Review Engineer. Two-lane commercial driveways should generally be 26 to 30 feet wide, with 30 feet preferred on the approach to an arterial street. Two-way 36-foot-wide multifamily and commercial driveways will be allowed when separate left- and right-turn exit lanes are required by the Review Engineer. A two-way commercial driveway wider than 36 feet may be approved by the Review Engineer where a substantial percentage of oversized-vehicle traffic exists.

6. Private Intersections

A private intersection opening shall be designed per Design Manual Drawing DEV-2 and Design Manual Standard 9 if permitted by the Review Engineer. See BCC 14.60.160 for additional requirements regarding private intersections. When a private intersection opening is permitted, the following criteria must be met in addition to the requirements of BCC 14.60.160:

- A.** A 100-foot minimum storage area shall be provided between the face of the curb (or edge of the travel lane where no curb exists) and any turning or parking maneuvers within the site;
- B.** The opening is at least 150 feet from the near-side face of the curb (or edge of the travel lane where no curb exists) of the nearest intersecting street; and
- C.** The opening is at least 100 feet away from any other driveway on the property frontage under the control of the property owner.

7. Street End Designs

- A.** Vehicle turnaround facilities required by BCC 14.60.170 shall be provided in accordance with this section and Design Manual Drawing DEV-1.
- B.** A hammerhead per Design Manual Drawing DEV-1 may be used to fulfill the requirement to provide a turnaround facility where the street serves (or will serve) nine or fewer residences.
- C.** A circular turnaround per Design Manual Drawing DEV-1 shall be provided for streets that serve (or will serve) ten or more residences.
- D.** Alternative street end designs may be allowed subject to review and approval by the Review Engineer and the fire marshal.
- E.** The maximum cross grade of a street at the street end shall be 8%.

8. Medians

- A.** A median shall be in addition to, not part of, the specified street width. Medians shall be designed so as not to limit turning radius or sight distance at an intersection. Pedestrian access across medians shall be as required by the Review Engineer and shall conform to the Americans with Disabilities Act standards.
- B.** Medians shall be designed so as to allow for the full width needed in adjacent lanes for any existing or planned bicycle facility.
- C.** Median edges shall be cement concrete traffic curb, provided that where emergency vehicle access across the median is required, the curb shall be a mountable type. See Design Manual Drawing TE-27.

9. Intersection Design

- A.** Intersection traffic control shall be designed as specified in the MUTCD and by the Review Engineer.
- B.** Intersections shall be designed to accommodate the design vehicle appropriate for the highest classified street forming the intersection. The intersection design shall take into account the presence of any designated truck route, bus route, or school bus route. All elements of the intersection shall be designed so the design vehicle will not encroach onto curbs, sidewalks, traffic control devices, medians, or the travel lanes of opposing travel flow. The minimum design vehicle shall be an AASHTO SU-30 vehicle unless otherwise approved by the Review Engineer.
- C.** Geometric Design Requirements:
 - (1) The angle of intersection of two streets shall be 85 degrees to 95 degrees unless otherwise approved by the Review Engineer.
 - (2) The minimum distance between adjacent parallel non-arterial streets shall be 150 feet, measured from nearest curb edge to nearest curb edge.
 - (3) The minimum curb radius at intersections shall be as shown in Table 4 below:

Table 4. Minimum Curb Radius at Intersections

Intersection Type	Curb Radius Dimension (ft)
Non-Arterial Street	25
Arterial	30
Bus Route	35
Downtown	35

10. Bridges and Retaining Walls

- A.** All bridges, whether on public streets or private roads, shall meet the minimum requirements set forth in the latest edition of the *AASHTO LRFD Bridge Design Specifications*, the *AASHTO Guide Specifications for LRFD Seismic Bridge Design*, and the *WSDOT Bridge Design Manual*. Vehicular live load design criteria shall be HL-93, as modified by the *WSDOT Bridge Design Manual*, except as allowed by the City of Bellevue Transportation Director. Additional loading and design considerations may be required by the Fire Marshal or the Transportation Director.
- B.** All bridges shall match the full width and configuration of the street, private road, or path being served (traveled way plus curb, sidewalk, walkway, bike lane, equestrian lane, and shoulder on one or both sides). Requirements of utilities shall be considered. Traffic barrier and pedestrian railing or combination traffic barrier/pedestrian railing shall meet AASHTO specifications and the requirements of the *WSDOT Bridge Design Manual*. Vertical clearance shall be a minimum of 16.5 feet (or state standard, whichever is greater).
- C.** Retaining walls supporting or protecting public transportation infrastructure, whether in right of way or on private property, shall meet the minimum requirements set forth in the latest edition of the *WSDOT Bridge Design Manual*.
- D.** All information required to create the Bridge Record file as described in Chapter 1.09 of the *WSDOT Bridge Inspection Manual* shall be supplied by the developer prior to acceptance of the finished structure by the Transportation Department.

11. Curb and Gutter

- A.** Cement concrete traffic curb and gutter shall be used for street edges whenever possible and shall always be used under the following conditions:
 - (1) On all public streets;
 - (2) In drainage low spots where special drainage facilities are required;
 - (3) On private roads with grades greater than 8%.
- B.** Cement concrete traffic curb shall be used for edges of islands and medians, provided that where emergency access across the median is required, the curb shall be a mountable type as per Design Manual Drawing TE-27.
- C.** All other curb and gutter shall be constructed as specified in Design Manual Drawing TE- 10.

12. Curb Ramps

Definition: a ramp cut into a roadway curb to allow access for physically challenged pedestrians to and from sidewalks and streets.

- A.** In accordance with state law and with federal guidelines established by the Americans with Disabilities Act, curb ramps shall be provided at all sidewalks, paths, and pedestrian crossings with curb ramp sections or elevation changes (where crossing is permitted). Ramps shall be designed as detailed in Design Manual Drawings TE-12A, TE-12B, TE-12C, and TE-12D, and placed whenever possible as shown in Design Manual Drawings TE-7A and TE-7B. Alternative placement must be approved by the Review Engineer.
- B.** Every ramp constructed per section A above that serves one end of a crosswalk shall be matched by another ramp at the other end of the crosswalk. No ramp shall be required if there is no curb or pedestrian facility at the other end of the crosswalk. Crosswalks may be marked or unmarked.

13. Guard Rail and Safety Railing

- A.** Guard rail shall be provided and installed by the developer as directed by the Review Engineer or the Inspector.
- B.** All guard rails along public and private roadways shall conform to the criteria of the WSDOT *Design Manual*.
- C.** Safety railing shall be provided and installed by the developer per the installation warrants of Design Manual Drawing TE-33 or as directed by the Review Engineer or the Inspector.
- D.** All safety railing shall conform to the requirements of Design Manual Drawings TE-34, TE-35, and TE-36.
- E.** Where a safety rail is placed on top of a wall, the Review Engineer may require additional sections of railing in order to prevent access behind the wall.

14. Sidewalks and Nonmotorized Facilities

- A.** See Design Manual Drawings DEV-17 through DEV-20 for width and subgrade specifications for each non-motorized facility type. Non-motorized facility construction shall, in addition to complying with the design requirements of this document, conform to current WSDOT *Standard Specifications*. Where feasible, the design of such facilities shall recognize AASHTO standards such as the *Guide for the Development of Bicycle Facilities*. The width of the easement shall be established by the Review Engineer but shall extend at least to the back of such sidewalk or facility. See also the City of Bellevue “Pedestrian & Bicycle Transportation Plan” for additional design elements and city project listings for pedestrian and bicycle projects.

B. Pedestrian Facility Construction

(1) Limited-purpose path construction:

- a. Acceptable surface materials are crushed rock and wood chips.
- b. The maximum grade shall not exceed 15%. Depending upon site conditions, stairs and/or switchbacks may be required. For grades greater than 5%, the Review Engineer may specify the type of paving material to be used.
- c. If equestrian use is anticipated, ten feet of vertical clearance is required.

(2) Multi-purpose path construction:

- a. Acceptable surface materials are crushed rock, wood chips, and asphalt.
- b. The maximum grade shall not exceed 10%. Depending upon site conditions, stairs and/or switchbacks may be required. For grades greater than 5%, the Review Engineer may specify the type of paving material to be used.
- c. If equestrian use is anticipated, ten feet of vertical clearance is required.

(3) Paved path construction:

- a. Acceptable surface materials are asphalt and concrete.
- b. The edges of asphalt paths shall be defined by inverted thickened edges along both sides to prevent edge deterioration.
- c. The maximum grade shall not exceed 10% (5% when bicyclist use is anticipated). Depending upon site conditions, stairs and/or switchbacks may be required. The Review Engineer may specify special paving and other treatment to be used on grades greater than 5%.
- d. Paths shall be located a minimum of five feet from the edge of the vehicular travel way. A physical barrier may be required in lieu of the five-foot separation when conditions dictate, particularly when bicyclist use is anticipated.
- e. A two-foot-wide graded shoulder is required on both sides of a paved bicycle pathway. The Review Engineer may require a wider graded shoulder if heavy pedestrian or equestrian use is anticipated.
- f. If equestrian use is anticipated, ten feet of vertical clearance is required.
- g. When asphalt paved paths are used, the widths shall correspond to the widths required for concrete sidewalks.

(4) Concrete sidewalk construction:

- a. All sidewalks shall be constructed with five-inch-thick Class 3000 concrete with a non-slip broom finish. For Downtown sidewalk requirements, see also Land Use Code 20.25A.060. Downtown projects are also subject to special requirements through the design review process.
- b. At driveways, the concrete shall be six inches thick.
- c. Specialty finishes may be allowed with the approval of the Review Engineer when the proposed material will provide a non-slip surface when wet and the adjacent property owner agrees to maintain, repair, and replace the specialty material at her/his own expense, even when the maintenance is made necessary because of city work.
- d. All lids for junction boxes and utility vaults located within the sidewalk shall be of a non-slip/non-skid type per ADA requirements, subject to approval by the Review Engineer.

- e. The width of a sidewalk does not include the curb. Sidewalks shall maintain their full width (five to eight feet as referenced below) around one side of obstructions that cannot be relocated. Concrete sidewalk widths shall be as follows:
- Public streets and private roads internal to subdivisions and short subdivisions: five feet (minimum);
 - Non-arterial streets external to subdivisions and short subdivisions: five feet to six feet;
 - Arterial streets external to subdivisions and short subdivisions: six to eight feet (width to be determined by the Review Engineer);
 - Downtown: See Land Use Code 20.25A.060;
 - Bel Red Subarea: See Land Use Code 20.25.D.140, Bel-Red Street Development Standards.
- f. Sidewalks shall meander no more than four feet from the curb at pedestrian crossings and at driveways.

C. Bicycle Facility Construction

- (1) Separated bicycle path – See requirements for paved path construction. Acceptable surface materials are asphalt and concrete.
- (2) Bicycle lane:
- a. Acceptable surface materials are asphalt and concrete.
 - b. A bicycle lane on a public roadway shall be a minimum of five feet wide when curb and gutter are in place. The distance shall be measured from the face of the curb to the center of the fogline that designates the bicycle lane. A cement concrete traffic curb and gutter is required. See Design Manual Drawing TE- 10.
 - c. A bicycle lane on a public roadway shall be a minimum of four feet wide when no curb and gutter is in place or when the bicycle lane is located between a through lane and a right turn lane. The width shall be measured from the edge of the pavement to the inside edge of the bicycle lane marking or between the nearest edges of the bike lane markings. A minimum two-foot-wide graded shoulder is required adjacent to the paved surface.
- (3) Shared roadway:
- a. Acceptable surface materials are asphalt and concrete.
 - b. The curb lane of a shared roadway shall be a minimum of 14 feet wide for flat or downhill sections and 15 feet wide for uphill sections. The distance shall be measured from the face of the curb to the center of the lane marking.

D. Safety railing shall be provided and installed by the developer when, in the opinion of the Review Engineer, warrants for safety railing as shown in Design Manual Drawing TE-33 are met, or as directed by the Review Engineer or the Inspector.

E. When hard surfaces are disturbed, all junction boxes within the hard surface shall be replaced with new junction boxes with non-skid lids.

15. Fixed Objects

Definition: an object having properties greater than a four-inch by four-inch wooden post.

- A.** A clear recovery area is a consideration when placing fixed objects along the roadside or within medians. The intent is to provide a traversable recovery area when opportunity allows. The design clear zone, as defined by the WSDOT *Design Manual*, is ten feet for roadways with a speed limit of 35 mph or under. See the WSDOT *Design Manual* for speed limits above 35 mph. It is acknowledged by the WSDOT *Design Manual* that within urban areas, it will not always be practical to provide this ten foot clear zone area.
- B.** When placing new fixed objects along a roadside or along a median with a traffic curb, attempt to select locations with the least likelihood of an impact by an errant vehicle. Always meet the minimum operational offset of three feet from the face of curb to the face of the object. This offset distance may be modified to 1.5 feet at the discretion of the Review Engineer (except for street light poles and signal equipment, for which the minimum offset distance shall be three feet).
- C.** New fixed objects placed along a roadside or median that does not have a curb shall meet the clear zone requirements listed below. If the clear zone requirement cannot be met, justification is required and must be approved by the Review Engineer.
 - (1) Minimum clear zone offset distance from roadside or median without a curb and with a speed limit 35 mph or less is ten feet. Modifications must be approved by the Review Engineer.
 - (2) Minimum clear zone offset distance from roadside or median without a curb and with a speed limit of 40 mph or greater shall be determined from the WSDOT Design Manual. Modifications must be approved by the Review Engineer.
- D.** Fixed objects shall not be located, or be allowed to remain, closer than ten feet to the edge of a driveway, identified as Point A in the Design Manual Drawings DEV-7A, DEV-7D, DEV-7E, and DEV-7F, unless modification is approved by the Review Engineer. Fixed objects shall be located such that they do not violate the vehicle and pedestrian sight obstruction requirements of Transportation Standards 21 and 22. See Design Manual Drawings TE- 1, TE-2, and TE-3 as well. The Review Engineer may modify this requirement if the modification will not compromise the safety of pedestrian or vehicular traffic.

16. Breakaway Objects

Definition: an object having properties up to and including that of a four-inch by four-inch wooden post. The following separation distances shall apply:

- A.** Minimum operational separation distance from roadside or median with a traffic curb is 1.5 feet. Modifications must be approved by the Review Engineer.
- B.** Minimum operational separation distance from roadside or median without a traffic curb is ten feet. Modifications must be approved by the Review Engineer.

17. Mailboxes

- A.** Mailboxes shall be clustered together where practical and where reasonably convenient to the houses being served. For groupings of three or more boxes within a new residential development, a neighborhood delivery and collection box unit consisting of locked boxes on a single pedestal shall be provided. For clustered mailboxes or units, access to the boxes shall be provided on both the street and sidewalk sides.
- B.** When mailboxes are located within the sidewalk, the sidewalk shall be widened to provide the full design width around the mailboxes.
- C.** When pedestrians have access to the back of a mailbox or mailbox cluster, units allowing access to the boxes from both sides shall be installed, if available.
- D.** In the case of new street construction, or street reconstruction that requires mailboxes to be installed or moved, the designer and builder shall coordinate with the station master or postmaster at the post office that serves the location. Mailbox locations approved by the U.S. Postal Service, and approved by the City of Bellevue Transportation Department to facilitate vehicle, bicycle, and pedestrian safety, shall be shown on approved street construction plans and installed at the approved locations. Temporary mailbox locations may be allowed during construction, if acceptable to the U.S. Postal Service and the City of Bellevue Transportation Department.
- E.** Mailboxes shall be installed as follows:
 - (1) The base of the box shall be 41 to 45 inches above the street.
 - (2) On non-arterial streets, the front of the mailbox shall be six to eight inches behind the vertical curb face or edge of pavement.
 - (3) On arterial streets, the front of the mailbox shall be one foot behind the back of the sidewalk on walking delivery routes, or six to eight inches behind the curb face on vehicular delivery routes.
 - (4) The mailbox shall be placed on posts strong enough to give firm support, but not to exceed the breakaway characteristics of a four-inch by four-inch wood post or 1.5-inch diameter pipe. See Design Manual Drawing DEV-11.
 - (5) Additional non-breakaway fixtures shall not be installed adjacent to mailbox locations. See Design Manual Sections 15 and 16.
- F.** Where feasible, installation of vehicle pullouts for mailbox access may be required by the Review Engineer.

18. Metal Covers within Streets

No junction boxes for traffic signalization or street lighting shall be placed within the street. Where feasible, manhole lids, valve boxes, and any other metal covers shall be located outside the vehicle tire paths of through lanes on any city street and outside of bicycle facilities. Preferred locations for metal covers are:

- A.** Outside the paved surface;
- B.** In a turn lane, where vehicle speeds and volumes are typically lower;
- C.** In parking lanes or on the shoulder, if not used for bicycle travel;
- D.** Near the center of a through lane, typically five to seven feet from the centerline of a two-lane street;
- E.** On the line separating two lanes, except for utilities that require frequent access or maintenance.

19. Street Illumination and Traffic Signals

A. Street Lighting

The street lighting system should be a complete, unified design that addresses the various mobility needs within the City of Bellevue in accordance with BCC 14.60.210.

- (1) Street lighting system designs shall follow the city's "Street Lighting Design Guide" (see Appendix A) and must be stamped by a licensed engineer experienced with lighting design.
- (2) Street lighting system design requirements are as follows:
 - a. Designs shall contain luminaire with pole spacing and type, illumination level, uniformity ratio, line losses, power source, the electrical and physical layout, installation details, and plans and specifications.
 - b. As-built street lighting plans for city-owned systems shall be provided to the city on 22-inch by 34-inch plan sheets prior to final occupancy, final plat approval, or release of an assurance device.
 - c. Lighting in residential plats is typically designed and installed by Puget Sound Energy after city approval of design.
 - d. Street lighting systems shall be designed to be accessible by a wheeled vehicle weighing 30,000 lbs.
 - e. Contactor cabinets equipped with electrical meters, time clocks, circuit breakers, and other required components are required on arterial installations, or as required by the Review Engineer.
 - f. The exact location of the power source shall be indicated together with the remaining capacity of that circuit. System continuity and extension shall be provided.
- (3) Street light pole bases shall be removed in their entirety, wherever necessary.

- (4) A combined street tree and street light plan is required for review and approval prior to completion of engineering and landscape plans for installation. The goal is to provide the optimum number of street trees while not compromising the light and safety provided by streetlights. Street trees and street lights must be shown on the same plan sheet with the proper separation (generally 25 feet apart) and the proper spacing from driveways (ten feet from Point A in standard drawings DEV-7A, DEV-7D, DEV-7E, and DEV-7F).
- (5) Street lighting is allowed but not required along private roads. Street lighting systems for private roads shall be designed and constructed on a separate power source from the public street lighting system. All street light maintenance, installation, and power costs for private road systems shall be paid by the property owner, homeowner, or homeowners' association.

B. Traffic Signals

If an existing traffic signal requires modification or relocation, or if a new traffic signal is warranted, the following standards shall be met in accordance with BCC 14.60.200:

- (1) Traffic signal designs shall be prepared by a licensed engineer experienced in traffic signal design. The engineer shall use common city practices, standard drawings, and city special provisions to the WSDOT *Standard Specifications*. A signal warrant study prepared by a licensed engineer shall be required for all new signal installations.
- (2) New or modified signals per BCC 14.60.200 may include requirement for payment for license and personality for the Sydney Coordinated Adaptive Traffic System (SCATS).
- (3) Communication systems that are modified by the developer will require a cutover plan and may require new cable between existing splice locations.
- (4) A minimum of two three-inch conduits shall be provided and installed across the frontage of the project with Type 7 junction boxes at each end.

20. Channelization and Signing

A. The Review Engineer shall review and approve all traffic control devices. All traffic control devices used on public streets and private roads shall conform to the MUTCD.

- (1) All signs such as street name, parking, stop, dead end, speed limit, and nonmotorized indicators shall be clearly indicated on the plans and will be field-located by the Review Engineer and the Inspector. It is the responsibility of the property owner to ensure that signs are maintained in good condition until the development and right of way are accepted by the city. Any damaged signs must be replaced by the property owner at her/his expense.
- (2) All channelization and pavement markings such as raised pavement markers, paint, thermoplastics, etc., shall be pre-marked by a city-approved striping contractor, and the layout approved by the Review Engineer, prior to permanent installation by the contractor.
- (3) Temporary traffic control and construction zone signing and barricades to ensure traffic safety during construction activities shall be provided by the developer.

B. Channelization and signing plans shall be prepared by a licensed engineer.

21. Sight Distance - Vehicles

- A.** For the purposes of this standard, sight obstructions are objects that block or obscure the view of motor vehicle operators at intersections. An intersection shall include the intersection of two public streets, the intersection of a commercial driveway with a public street, the intersection of a residential driveway with a public street, and the intersection of a private road with a public street. Sight obstructions are not permitted above a line two feet above the street surface and below a line seven-and-a-half feet above the street surface. This line is reduced from seven-and-a-half feet to six feet within the setback areas for residential driveways.
- B.** Development proposals shall demonstrate that no vehicle will be parked (or any sign, fence, rail, hedge, shrubbery, natural growth, or other obstruction installed) that obstructs the view of motor vehicle operators at an intersection within the sight areas established in Design Manual Drawings TE-1, TE-2, and TE-3, and between the height limits established herein.
- C.** The sight area at an intersection is defined as the area bounded by setback lines or bounded by setback lines and the edge of the travel lane (see Design Manual Drawings TE-1, TE-2, and TE-3). Setbacks for intersection types are as specified in the following:
- (1) Major Street/Minor Street, Major Street/Commercial Driveway, and Major Street/Private Road. Intersections of these types have either no control or flashing yellow on the major street and have a stop sign or flashing red signal on the minor street. Private commercial driveways (which may or may not have a stop sign) used by the public for entering any city street are also included in intersections of this type.
- The right and left setback lines are defined as the lines that join a point in the center of the minor street approach lane located 14 feet back from the edge of the major through-street approach lane (Point A) and a point in the center of the major through-street approach lane (Point B). The locations of Points A and B in the minor street approach lane and the major through-street approach lane, respectively, are specified in Design Manual Drawing TE-1.
- Where the major street is a divided highway, only the left setback line applies. Where the major street is a one-way street, only the setback line toward the direction of approach applies.

Modification: Where major obstacles such as pre-existing permanent structures, elevated contours of the ground, embankments, or other elements preclude the reasonable enforcement of the setback lines specified above, these setbacks may be modified at the discretion of the Review Engineer. The minor street setback distance to Point A may be reduced from 14 feet to ten feet, and the major street Point B location may be modified as follows:

Table 5. Modified Sight Distance Lines

Posted Speed Limit for Major Street	Distance from Center of Intersection to Point B
40 MPH	325 Feet
35 MPH	250 Feet
30 MPH	200 Feet
25 MPH	150 Feet

- (2) Uncontrolled Intersection. For intersections with no traffic control on any approach, the setback lines join a point on the approach located 50 feet back from the center of the intersection with points located 80 feet back from the center of the intersection on the right- and left-hand streets. All points are on the street centerlines. See Design Manual Drawing TE-2.
- (3) Yield Intersection and T Intersection. Yield intersections have a yield sign on one or both minor street approaches and no control on the major street approach. The setback lines for yield intersections join a point in the center of the yield approach lane 25 feet back from the edge of the crossing traffic lane with points in the centers of the crossing approach lanes 100 feet back from the center of the intersection. This setback also applies to a T intersection with no restrictive control; in this case, the 25-foot setback point is on the stem of the T. See Design Manual Drawing TE-2.
- (4) Signalized Intersection. For signalized intersection approaches with right-turn-on-red-after-stop permitted, the left setback line joins a point in the center of the minor street approach lane located 14 feet back from the edge of the through-street approach lane (Point A) and a point in the center of the left through-street approach lane (Point B). The location of Point A may be reduced to ten feet subject to approval of the Review Engineer. The locations of Points A and B are specified in Design Manual Drawing TE-1.
- (5) Residential Driveway Intersection. For the intersection of a residential driveway with a public street, the setback line joins a point in the center of the driveway (Point A) with a point in the center of the through-street approach lane (Point B). The setback distance of Point A from the edge of the traveled lane is ten feet. The location of Point B is specified in Design Manual Drawing TE-1.

Modification: When the residential driveway is located on a residential street with a sharp curve adjacent to the driveway, the distance of Point B may be reduced from 150 feet to 100 feet. For residential driveways with major obstacles or other special circumstances obscuring sight distance, the setback distance on the driveway (Point A) may be reduced from ten feet to eight feet subject to the approval of the Review Engineer.

- (6) Sightline Setback – Other. For intersections not clearly included in the above types and for which special circumstances obscuring sight distance exist, the Review Engineer will establish setback lines to the most feasible extent.
- D.** The Review Engineer may allow a deviation from the foregoing provisions, including the requirement of a greater sight distance, to meet special circumstances provided that the resulting sight distance is reasonable given the circumstances and is anticipated to meet the intention of the sight distance standards described herein. The Review Engineer may require or impose additional requirements to mitigate the allowed deviation, including but not limited to: the removal or relocation of fences and vegetation; the modification of handrails on subject property, adjacent property, or street right of way; and the restriction of turning movements by the installation of c-curbs.
- E.** Sight lines from vehicles to traffic control devices, including but not limited to signs and signals, shall not be obscured by landscaping, street furniture, marquees, awnings, or other such obstructions.
- F.** Every obstruction of the sort prohibited in this section hereafter installed or permitted to remain shall be deemed a violation of this sight distance standard.

22. Sight Distance - Pedestrians

- A.** The minimum sight distance for pedestrian safety shall be as shown in Design Manual Drawing TE-3 and determined as follows: The driver of an exiting vehicle shall be able to view a one-foot-high object 15 feet away from the edges of the exiting lane or lanes, measured at the back of the sidewalk, when the driver's eye is 14 feet behind the back of the sidewalk.
- B.** The minimum sight distance as defined in Design Manual Standard 22.A shall be maintained at all driveways, buildings, and garage entrances where structures, wing walls, etc., are located adjacent to or in close proximity to a pedestrian walkway.

23. Trench Backfill and Restoration

- A.** Materials and workmanship shall be in conformance with the WSDOT/APWA *Standard Specifications for Road, Bridge, and Municipal Construction*. Construction shall be in conformance with Design Manual Drawings ROW-1 through ROW-9, the details and conditions outlined in the Right of Way Use Permit, and the following:
- (1) Trench restoration shall be accomplished with a patch or an overlay as required by the Pavement Restoration Requirement Map or the Review Engineer.
 - (2) If a patch is used, the trench limits shall be sawcut prior to final patch.
 - (3) All trench and pavement cuts shall be made by sawcuts or by grinding. The sawcuts or grinding shall have a minimum distance outside the trench width as shown in Design Manual Drawings ROW-1 through ROW-9.
 - (4) If the Right-of-Way Use Permit requires an overlay, then the contractor may use a jackhammer or drum grinder for the cutting of the existing pavement.
 - (5) Within the top four feet of trenching, backfill shall be crushed surfacing materials or a controlled-density fill material conforming to section 4-04 of the WSDOT/APWA Standard Specifications. Backfill materials must be inspected and accepted by the Review Engineer.
 - (6) If the existing material is determined by the Inspector to be suitable for backfill and the trench is not perpendicular to a travel lane or driveway, the contractor may use the native material as long as the top eight inches is crushed surfacing material.
 - (7) Material used for backfill below four feet in depth must be approved by the Inspector.
 - (8) All trench backfill shall be compacted to 95% maximum density, as described in section 2-03 of the WSDOT/APWA Standard Specifications.
 - (9) Backfill compaction shall be performed in eight-inch to 12-inch lifts. The Compaction tests shall be performed in maximum backfill increments of two feet. The test results shall be given to the Inspector for review and approval prior to paving. Material testing will be required for trench backfill (native or imported), asphalt, and concrete. Testing shall be performed by a certified independent testing laboratory. The cost of testing is the responsibility of the franchise utility or contractor. The number of tests required shall be the same as for asphalt density testing, or as directed by the Inspector. Acceptance testing may also be performed as directed by the city Materials Engineer as required.
 - (10) Temporary restoration of trenches for overnight use shall be accomplished by using hot mix asphalt (HMA) or steel plates. HMA used for temporary restoration may be dumped directly into the trench, bladed out, and rolled. After rolling, the trench must be filled flush with asphalt to provide a smooth riding surface.
 - (11) HMA shall be placed to the compacted depth as shown on Design Manual Drawings ROW-1 through ROW-9 and as directed by the Review Engineer. Asphalt cement shall be paving asphalt. Materials shall conform to the WSDOT/APWA Standard Specifications.
 - (12) Tack shall be emulsified asphalt grade CSS-1 as specified in the WSDOT/APWA Standard Specifications and shall be applied to the existing pavement and edges of sawcuts as specified in the WSDOT/APWA Standard Specifications.

- (13) HMA shall be placed on the prepared surface by an approved paving machine and shall be in accordance with the requirements of the WSDOT/APWA Standard Specifications. Fine and coarse aggregate shall be in accordance with the WSDOT/APWA Standard Specifications. Asphalt concrete over two inches thick shall be placed in equal lifts not to exceed the guidelines set forth in the WSDOT/APWA Standard Specifications. See Design Manual Drawing DEV-9.
- (14) Cuts for trenches in all street surfaces, walks, and driveways shall be either ground or sawcut. Ground joints shall be feathered and shimmed to provide a smooth surface. Feathering and shimming shall be accomplished by raking out the oversized aggregates from the mix. Surface smoothness shall conform to the WSDOT/APWA Standard Specifications. The paving shall be corrected by removal and repaving of the trench only.
- (15) Compaction of all lifts of asphalt shall be at an average of 92% of maximum density as determined by the WSDOT Field Operating Procedures for AASHTO 209 Test Method. The number of tests required per square foot of trenching shall be as follows:
 - a. One set of three tests for less than 300 square feet of trenching area;
 - b. One additional test for every 200 square feet over 300 square feet of trenching area or every 100 lineal feet of trench, if applicable.Testing shall be performed by a certified independent testing laboratory. The cost of testing is the responsibility of the franchise utility or contractor. Acceptance testing may also be performed as directed by the city Materials Engineer. The testing is not intended to relieve the contractor from any liability for the trench restoration. It is intended to show the Inspector and the city that the restoration meets these specifications.
- (16) All joints shall be sealed using paving asphalt.

- B.** Contractors performing asphalt restoration work must be pre-qualified by the Transportation Department. To be pre-qualified, a contractor must submit qualifications in writing to the Pavement Manager. Past performance and available paving equipment will be reviewed to determine eligibility for the approved contractor list.
- C.** A five-year moratorium on pavement excavation and trenching will be enforced following the completion of a new street or street overlay. This requirement restricts all street trenching except in the event of an emergency or as authorized by the city Transportation Director or his/her designee (the Right of Way Manager) per BCC 14.60.250.
- D.** Asphalt patch depths will vary based upon the classification of the streets being trenched. The asphalt depths shall be shown on the Right-of-Way Use Permit and the work shall be performed as required per Design Manual Drawings ROW-1 through ROW-9. The minimum paving depths for all trenching shall be approved by the Inspector prior to restoration activity.
- E.** When trenching occurs within the street shoulder, the shoulder shall be restored to its original or better condition within 30 days of first opening the trench.
- F.** The final patch shall be completed within 30 days of first opening the trench. This time frame may be adjusted if delays are due to inclement weather or other adverse conditions. Delay of the final patch or overlay work must be approved by the Review Engineer and will require an assurance device to guarantee completion.

- G.** Any patch or overlay located Downtown shall be permanent and be completed as soon as possible.
- H.** Upon completion of asphalt restoration, the restored area shall be swept clear of loose material.

